

WHAT IS CLAIMED IS:

1. A perpendicular magnetic recording type disk drive comprising:

a double-layered perpendicular magnetic type disk medium having a recording magnetic layer of perpendicular magnetic anisotropy and a soft magnetic layer; and

a magnetic head containing a read head element for reading data from the disk medium,

the read head element using a giant magnetoresistive (GMR) element, and when outputting a read signal waveform corresponding to a reproduction magnetic field from the disk medium, outputting the read signal waveform in which waveform distortion due to leaking magnetic field from the disk medium is suppressed.

2. The disk drive according to claim 1, wherein the read head element has a reproduction characteristic of linear response dynamic range larger than an average value of reproduction magnetic field from the disk medium.

3. The disk drive according to claim 1, wherein the read head element has a saturation magnetic field characteristic larger than the average magnetic field from the disk medium magnetized uniformly to any one of positive and negative polarities.

4. The disk drive according to claim 1, wherein

the read head element has a linear response magnetic field characteristic indicating a maximum value larger than the average magnetic field from the disk medium magnetized uniformly to any one of the positive and negative polarities.

5 5. The disk drive according to claim 1, wherein the read head element has an artificial antiferromagnetic coupling magnetic field larger than the maximum magnetic field from the disk medium magnetized uniformly to any one of the positive and negative polarities.

10 6. The disk drive according to claim 1, wherein the read head element, assuming that artificial antiferromagnetic coupling magnetic field is H_{ex} , shield gap length is G_s , a distance from the read head element to the surface of the recording magnetic layer is d_{mag} , and remnant magnetization of the recording magnetic layer is M_r , has a characteristic satisfying a relational expression " $H_{ex} > 8M_r * \arctan[G_s / (2d_{mag})]$ ".

15 20 7. The disk drive according to claim 1, wherein the disk medium has a bias magnetic field applying layer for fixing a magnetization direction of the soft magnetic layer and

25 the read head element has a characteristic that the direction of the longitudinal bias for determining an operating point becomes the same direction as a magnetic field received from the bias magnetic field

8. The disk drive according to claim 1, wherein the read head element is a spin-valve type GMR element having a hard magnetic field film for longitudinal bias and has a characteristic that a ratio between a product Mst of magnetization and film thickness of a free layer and a product Mrt of remnant magnetization and film thickness of the hard magnetic film (Mrt/Mst) is set to 3 or more.

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